

# SOIL SURVEY OF DURHAM COUNTY, NORTH CAROLINA.

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## DESCRIPTION OF THE AREA.

Durham County is situated in the north-central part of North Carolina, Durham, the county seat, being 25 miles northwest of Raleigh.

The county is roughly rectangular in shape, with a maximum width of some 16 miles and a length of 25 miles. Its total area is 291 square miles, or 186,240 acres.

Durham County lies wholly within the Piedmont Plateau province and the general topography is that of a gently rolling upland, resulting from the dissection of an ancient peneplain. The elevation in the northern half of the county ranges from about 450 to 600 feet above sea level, and in the southern part from about 275 feet to 400 feet. At the courthouse in Durham the elevation is 405 feet. The northern part of the county is underlain by hard crystalline rocks; the southern part by soft rocks of Triassic age. This part of the county is known geologically as "the old sea bed," and there is a considerable drop from the igneous-rock formations to the Triassic in this part of the State.

Throughout the northern, and particularly the northeastern part of the county, the surface is prevailingly level, gently rolling, or rolling, and the broad interstream areas become steeply rolling to broken as the stream courses are approached. The slopes in many places are smooth or well rounded. The steepest slopes are developed along Eno, Little, Flat, and Neuse Rivers and Mountain and Crooked Creeks. Some of the smoother and flatter areas in this part of the county occur over a slate formation. In the southern half of the county the surface varies from undulating to gently rolling; on the broader divides it becomes broken and dissected near the streams.

There is considerable bottom land along nearly every stream in the county, except those in the Slate Belt, which are bordered in most places by steep slopes. The broadest strip of bottom land is that along Neuse River near the mouth of Flat and Eno Rivers, where the bottom in places is over a mile wide. In the southern half of the county the bottom lands are continuous along most of the streams; in the northern part they are narrow; and along Little River, the northern part of Flat River, and the greater part of Eno River the

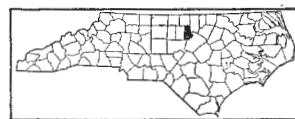


FIG. 40.—Sketch map showing location of the Durham County area, North Carolina.

uplands generally come down to the streams. The first bottoms are all subject to frequent overflows. A few scattered strips of terraces or second bottoms occur along some of the streams.

The county is thoroughly dissected by streams, and is generally well drained, only a few flat areas in the upland and a part of the bottom lands needing artificial drainage. The Eno, Little, Flat, and Neuse Rivers and their tributaries drain the northern half of the county. The southern half is drained by a number of creeks, of which Newhope Creek is the most important. Over much of the county the run-off is rapid and in many places causes severe erosion or gullying of the slopes, especially in the southern part of the county. The streams have cut to a depth of 50 to 200 feet and are still deepening their channels. The larger streams, except Newhope Creek, have fairly swift currents. There is sufficient fall to the larger streams in the northern part of the county for development of water power adequate for flour and grist mills. The Orange cotton factory on Little River is operated partly by water power.

Durham County was formed from parts of Orange and Wake counties in 1881. The early settlers were largely of English descent, with some Scotch. The majority of the present population are direct descendants of the original settlers. The population in 1920, as reported by the United States Census, was 42,219, of which 48.6 per cent is classed as rural. Although the county is well settled, there is much uncleared land suitable for farming. Durham, the county seat, is located near the center of the county and is the largest town, with a population of 21,719 in 1920. It is the main trading center for tobacco, cotton, and other farm crops. Bahama and Rougemont are small but prosperous towns.

Durham County is traversed by the Goldsboro-Asheville branch and the Durham, Oxford & Henderson branch of the Southern Railway and the Durham-Henderson branch of the Seaboard Air Line Railway. The Norfolk & Western Railway runs from Durham to Richmond. The Durham & Southern Railway and the Durham & South Carolina (Norfolk Southern) Railroad traverse the southern part of the county. These railroads provide excellent transportation for the entire county.

The main public roads have been regraded and surfaced. The Central Highway from the coast to the western part of the State passes through Durham County, and is being made a hard-surface road. The road from Durham to Roxboro (in Person County) is a well-graded "Warrenite" road for 10 miles.

The county is well supplied with churches and schools, and rural mail routes reach practically every section. Durham is an excellent market for all farm products, particularly tobacco, warehouses there handling millions of pounds annually. Durham also is noted as a tobacco-manufacturing city.

#### CLIMATE.

Durham County, situated in the warm temperate zone, has a mild climate suited to many farm and truck crops. The summers are rather long but not oppressive. The cold period in winter is usually of short duration, and outdoor work can be carried on practically

throughout the year. The mean annual temperature is 59.4° F. The rainfall is adequate, averaging 49.32 inches, and is well distributed throughout the year. The precipitation is heaviest in the summer and lightest in the fall.

The average date of the last killing frost in the spring is April 7, and the average date of the first killing frost in the fall is October 29, making an average growing season of 205 days, which is sufficient for all crops grown in this section. The earliest killing frost recorded in the fall occurred on October 1 and the latest in the spring on May 10.

There is no Weather Bureau station in Durham County. The following table, giving the normal monthly, seasonal, and annual temperature and precipitation, is compiled from the records of the station at Chapel Hill, about 4 miles west in Orange County, and is fairly representative of the climatic conditions in Durham County.

*Normal monthly, seasonal, and annual temperature and precipitation at Chapel Hill, Orange County.*

[Elevation, 500 feet.]

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1912).	Total amount for the wettest year (1901).	Snow, average depth.
December.....	42.2	79	6	3.86	2.20	4.56	1.7
January.....	39.8	80	-1	4.29	2.40	2.39	2.5
February.....	42.9	77	-6	4.51	3.52	1.52	4.5
Winter.....	41.6	80	-6	12.66	8.12	8.47	8.7
March.....	49.4	92	13	4.57	6.47	3.72	.9
April.....	58.8	97	26	3.44	3.88	5.89	T. .0
May.....	68.0	98	29	3.92	7.17	11.38	.0
Spring.....	58.7	98	13	11.93	17.52	20.99	.9
June.....	75.6	104	41	4.46	4.51	5.69	.0
July.....	78.7	107	52	5.49	.57	6.12	.0
August.....	77.0	105	52	5.55	1.70	11.25	.0
Summer.....	77.1	107	41	15.50	6.78	23.06	.0
September.....	71.5	103	35	3.22	3.17	4.75	.0
October.....	59.9	95	26	3.15	.99	2.13	T. .5
November.....	49.9	87	13	2.86	2.00	1.94	.5
Fall.....	60.4	103	13	9.23	6.16	8.82	.5
Year.....	59.4	107	-6	49.32	38.58	61.34	10.1

#### AGRICULTURE.

Agriculture has been the principal interest of Durham County since its settlement. The earlier settlers grew tobacco, corn, cotton, wheat, oats, sweet potatoes, and rye. The first lands cultivated were along the streams. They were farmed until crops did not produce well or until the top soil had all been washed off from the slopes; then they were allowed to revert to forest. Old corn and cotton rows can still be seen in some of the areas now supporting a sturdy forest of pine or hardwoods.

Tobacco has been the most important cash crop since 1881 and the acreage has increased steadily. Cotton has also been a cash crop, but it has declined greatly since 1889. According to the Federal census of 1890, 4,059 acres produced 1,009 bales, no record given in 1900, and in 1920, 1,252 acres produced 563 bales. Tobacco has been on a steady increase. The growing of clover and alfalfa for hay had received very little attention until about 15 to 20 years ago. They are used for hay and green manuring.

The following table gives the acreage and production of leading crops, as reported by the last four censuses.

*Acreage and production of leading crops, Durham County, in 1889, 1899, 1909, and 1919.*

Crop.	1889		1899		1909		1919	
Corn .....	<i>Acres.</i> 15,291	<i>Bushels.</i> 165,628	<i>Acres.</i> 16,299	<i>Bushels.</i> 216,830	<i>Acres.</i> 13,729	<i>Bushels.</i> 201,301	<i>Acres.</i> 13,057	<i>Bushels.</i> 146,222
Wheat .....	7,343	48,374	4,748	23,020	2,726	22,331	4,183	35,844
Oats .....	5,722	45,649	2,622	17,430	1,119	9,880	405	3,904
Tobacco .....	3,658	<i>Pounds.</i> 1,274,544	2,829	<i>Pounds.</i> 1,528,850	3,424	<i>Pounds.</i> 1,955,807	7,336	<i>Pounds.</i> 2,656,569
Cotton .....	4,059	<i>Bales.</i> 1,009	.....	<i>Bales.</i> .....	2,035	<i>Bales.</i> 888	1,252	<i>Bales.</i> 563
Hay and forage.....	750	<i>Tons.</i> 737	925	<i>Tons.</i> 1,328	2,626	<i>Tons.</i> 3,327	6,196	<i>Tons.</i> 4,180

It will be noted that the acreage of corn has been fairly constant. Wheat has been grown in a more variable acreage, but is less important now than it was 30 years ago. The area devoted to oats has steadily decreased. The tobacco acreage dropped off in 1899, but has increased considerably since then. The acreage in cotton in 1919 was about one-third as large as in 1889. While there has been a decrease in the acreage of corn, wheat, oats, and cotton, there has been a substantial increase in hay and forage crops.

The present agriculture of Durham County consists of the production of tobacco as the chief cash crop, cotton as a secondary cash crop, and corn, wheat, hay, oats, sweet potatoes, and vegetables as important subsistence crops.

The production of tobacco in 1909 and 1919, as reported by the census, was 1,955,807 pounds and 2,656,569 pounds, respectively. The Adcock, Warne, and Improved Adcock are the principal varieties grown. All the tobacco is flue-cured and is used in the manufacture of cigarette, smoking, and chewing tobaccos. Most of it cures to a bright yellow color and commands a good price.

Cotton is also a cash crop, but little interest is taken in its production and the acreage devoted to it is decreasing. In 1889 cotton occupied a larger area than tobacco, but in 1919 the acreage of tobacco far exceeded that of cotton. The production of cotton is decreasing because tobacco is considered more profitable.

Corn occupies the largest acreage of any crop in the county. It is mainly a subsistence crop, being fed to work stock, hogs, cattle on the farm, and ground into meal for home use. There is not enough corn grown to meet the local demand, and many farmers buy feed and meal annually, especially the tobacco growers.

Wheat ranks next in importance. Most of it is ground into flour for home consumption, although many farmers in the northwestern part of the county sell some wheat on the local market.

The less important crops include oats, sweet potatoes, cowpeas, clover, soy beans, fruits, and vegetables grown for home use. The production of hay and forage has increased rapidly since 1900, but not sufficiently to supply local needs, and much hay is shipped in annually. Since 1910 the growing of clover and alfalfa has received much attention in the northern half of the county, but the fields are usually small. Clover and alfalfa are generally cut for hay, which is fed mostly to work stock, but occasionally a crop is turned under for soil improvement.

According to the census there were 12,509 apple trees, 9,437 peach trees, 1,555 pear trees, 636 plum and prune trees, 1,162 cherry trees, and 2,410 grapevines in the county in 1920. Some garden vegetables are grown on every farm, mostly for home use. The surplus is sold on the local market. Potatoes, sorgo, strawberries, cherries, and raspberries are grown to some extent.

Hogs and a few cattle are raised on almost every farm, principally to supply home needs, and the surplus is sold locally. There were 5,707 hogs, 888 calves, 561 other cattle, and 31 sheep and goats sold or slaughtered in 1909. The census of 1920 does not give these items. A number of small dairies, carrying herds of cows, supply milk to residents of Durham. Every farmer has one or more cows to furnish milk and butter for home use and a great many have a surplus of butter that is sold in the local towns. The census report shows that \$134,775 worth of dairy products were sold in 1919, and \$33,664 worth of chickens and eggs.

Very few colts are raised in the county, and a large number of work animals, mostly mules, are shipped in every year.

The value of the various agricultural products of the county in 1919, as reported in the 1920 census, is given in the following table:

*Value of agricultural products in 1919.*

Cereals .....	\$379,822	Livestock and livestock products:
Other grains and seeds .....	6,028	Animals sold and slaughtered <sup>1</sup> \$151,565
Hay and forage .....	114,480	Dairy products..... 264,397
Vegetables .....	179,747	Poultry and eggs..... 125,887
Fruit and nuts .....	19,045	Wool ..... 68
Tobacco .....	1,434,547	Honey and wax..... 1,855
Cotton .....	97,962	
All other crops .....	23,057	Total ..... 2,798,460

<sup>1</sup> Estimated.

The adaptation of soils to different crops is recognized to a certain extent by the better farmers. The light-colored soils, whether they be sandy or silty, are considered best for tobacco. The Georgeville silt loam, Cecil gravelly fine sandy loam, Cecil fine sandy loam, and Davidson clay loam are considered well suited to the growing of small grains, clover, corn, and cotton. The Durham sandy loam and fine sandy loam, Granville sandy loam and fine sandy loam, White Store sandy loam and fine sandy loam, and the Alamance silt loam are recognized as best adapted to tobacco. The Iredell loam and Mecklenburg loam are good soils for corn, cotton, small grains, and clover. The Congaree and Altavista soils, alluvial types, are used almost entirely for grass and corn.

The farm buildings of Durham County are substantial. The barns are usually small, but ample for housing stock and farm products. A good many farms are equipped with large dwellings with modern conveniences, and these have larger barns and better outbuildings. There are no silos or large dairy barns, except near Durham, where there are some such buildings for the dairy herds that supply milk to the city. The best farms are equipped with improved farm machinery, consisting of tractors, threshers, corn harvesters, reapers and binders, shredders, one-horse and two-horse turning plows, disk and spike-tooth harrows, cultivators, and mowing machines. The work stock consists largely of mules, though horses also are used. The dairy cattle are mostly Jersey, Holstein, and grades of these breeds.

Although no systematic rotation of crops is practiced in the county, the better farmers follow some sort of crop succession. In the wheat-growing section wheat is followed by clover, which is allowed to remain two years and then followed by corn or cotton. Peas are sometimes sown after wheat, and corn is planted the following season. Most of the better farmers sow rye and crimson clover as cover crops or as green-manure crops.

Commercial fertilizers, most of them complete mixtures, are used by nearly all the farmers. The census reports a total expenditure of \$211,209 for fertilizers in 1919. Home mixtures are being used to a small extent. For tobacco a high-grade fertilizer is used at the rate of 500 to 1,200 pounds per acre. The prevailing formulas are 8-2-2 and 8-3-3<sup>1</sup>. A home mixture of acid phosphate and cottonseed meal also is frequently applied. Corn, wheat, and cotton never receive as heavy application as tobacco. Sometimes acid phosphate is used alone for wheat.

Owing to the demand for men in factories, mills, and public works at attractive wages, farm labor is scarce and wages high; consequently farmers depend mostly on their own families for labor. For farm work men receive at present (1920) from \$2 to \$4, and women and children from 75 cents to \$2 per day. Farm laborers hired by the month receive from \$40 to \$60 per month, with room and board furnished. The 1920 census reports the total expenditure for labor on 226 farms in 1919 as \$45,258.

According to the census of 1920, there are 1,769 farms<sup>2</sup> in Durham County, and their combined area amounts to 67.2 per cent of the total area of the county. The average size of farms is 75.9 acres, and the percentage of improved land 31.7 per cent, or 24 acres per farm.

Of the total number of farms, about 45 per cent are operated by owners and 55 per cent by tenants. The land is usually leased on shares. Where the landlord furnishes land, stock, implements, and half of the fertilizer, he receives half of the crops; where the tenant furnishes stock, implements, and three-fourths of the fertilizer, the landlord receives one-fourth of the crops. A few farms are rented for cash.

Land values<sup>3</sup> vary according to the character of the soil, the state of improvement of the farms, and nearness to towns, railroad stations, and highways. Near Durham land is comparatively high, ranging

<sup>1</sup> Percentages, respectively, of phosphoric acid, nitrogen, and potash.

<sup>2</sup> The census enumerates each tenancy as a farm.

<sup>3</sup> The prices of land given here and in other parts of this report are the prices that prevailed in 1920, when they were at the peak. They should, therefore, be considered as relative values only.

from \$100 to \$400 an acre. At present (1920) high prices prevail in every section of the county, ranging from \$20 for rough and unimproved land to \$200 for the better improved land.

#### SOILS.

Durham County lies wholly within the Piedmont Plateau province, and all the upland soils are residual; that is, they have been formed in place from the underlying rocks through processes of weathering and decomposition. These underlying rocks include slate, sandstone, mudstone, shale, granite, diorite, and other formations.

There are four main groups of rocks, each having different characteristics and each giving rise to different groups of soils: (1) slate, occupying the northwestern part of the county; (2) sandstone, mudstone, and shale (Triassic), in the southern half; (3) granite, occurring in small areas in the eastern, northeastern, and northwestern parts of the county; and (4) diorite, underlying scattered areas throughout the county.

The slate belongs to the Carolina slate formation, which is extensively developed throughout the southern and central parts of North Carolina. The rocks are fine grained and in their unweathered condition have a grayish or bluish color, but upon disintegration and weathering many colors are developed, including gray, pink, purplish, yellow, and red. Some other rocks are included in this group. The material formed from the decay and weathering of these slates consists mostly of silt and clay, with a small proportion of very fine sand.

The Triassic rocks consist of Indian-red or purplish-red and gray sandstone, mudstone, and shale. Upon weathering these rocks give rise to sandy and fine sandy loam soils, with considerable variation in color, the diversity being due in part to difference in local drainage conditions. The principal subsoil colors are dull red, Indian red, or mottled red, gray, white, and yellow (White Store material), and yellow (Granville material), near the diorite dikes that have cut through the Triassic rock. The sandstone, mudstone, and shale have been changed by contact metamorphism, giving a grayish and bluish color, but these changed rocks are inextensive and spots of soil formed from them are not shown on the map. The Triassic rocks have weathered deeper than the other rocks of the county, although on some of the steeper slopes the soil material has been washed off, leaving the rock exposed.

The granite in this county is light colored, prevailingly fine in texture, and composed principally of quartz, feldspar, and mica. Some coarse-grained granite occurs in the vicinity of Funston and west of Whites School, and gneiss occurs in places. The diorite is a dark-colored, fine-grained, tough rock, locally known as "niggerhead" or "iron rock." Diabase and gabbro-diorite are included with this rock. Both diorite and granite are igneous rocks that have crystallized from a molten mass, which in this county appears to have been forced through fissures in other rocks, such as slate and Triassic sandstone, mainly in the form of dikes. Intrusions or dikes of diorite are conspicuous throughout the county.

The stream-bottom soils are derived from alluvium; that is, material that has been washed down from the uplands and deposited over the flood plains of the rivers and creeks. These soils are the most recent

in the county and are still in process of formation, as additional material is deposited over the bottoms during every inundation. This bottom land varies according to the condition of drainage between periods of overflow, the better drained areas having a brownish color and the more poorly drained areas a grayish or mottled, grayish-yellow, and bluish color. All the first-bottom soils are classed in the Congaree series.

Strips of second-bottom, or terrace, soils are scattered over the county. These were deposited when the streams were flowing at a higher level; that is, before the streams had cut their channels to the present depths.

The soils of Durham County, having been derived from rocks that vary widely in their physical and chemical compositions, also vary greatly in color, texture, and structure. The soils that have a common origin and are similar in structure and color are grouped into a soil series. Each series, therefore, consists of soil types that differ from each other only in the texture of the surface soil. The White Store, Granville, Georgeville, Alamance, Davidson, Iredell, Durham, Cecil, Appling, Mecklenburg, Wilkes, Conowingo, Congaree, and Altavista series are represented in this county.

The types of the White Store series are characterized by grayish-brown to dull-reddish surface soils and a plastic, sticky, heavy subsoil, colored dull red, dark red, or red with grayish, yellowish, and whitish mottlings. These soils are derived from red and gray sandstone, mudstone, and shale. The subsoil of this series is much more plastic and sticky than that of the other soils derived from Triassic rocks. The White Store sandy loam and the fine sandy loam, with a shallow phase, are mapped in Durham County.

The Granville series includes types with grayish-yellow to yellowish-brown surface soils that dry out to a very light grayish or brownish yellow, and a subsoil of yellow friable sandy clay to clay. It resembles the Durham series, but the subsoil is slightly heavier and more plastic, and in the lower part of the 3-foot section contains mottlings of gray, white, drab, Indian red, and purple. Two types, the Granville sandy loam and Granville fine sandy loam, are mapped.

The Georgeville and the Alamance series are derived from slate of the Carolina Slate Belt. The Georgeville series has light yellowish brown to reddish surface soils and a red, brittle subsoil. The Alamance series differs from the Georgeville in that the surface soils are light yellowish or brownish yellow to whitish in color and the subsoil is a yellow, compact, but friable silty clay loam to silty clay. The Georgeville silt loam with a gravelly phase and the Alamance silt loam and very fine sandy loam are developed in the present area.

The types of the Durham series are characterized by grayish or light grayish yellow surface soils, and a yellow friable sandy clay to clay subsoil. These soils are derived from light-colored granites. The Durham sandy loam and fine sandy loam are mapped.

The Cecil series consists of types with light-brownish to reddish surface soils and a bright-red, stiff, brittle clay subsoil. These soils are derived mainly from granite and gneiss, together with some schist, all which rocks have generally weathered to considerable depth. The Cecil series is represented in Durham County by two types—Cecil fine sandy loam and gravelly fine sandy loam.

The types of the Appling series have light-brownish, grayish, or brownish-yellow surface soils and a reddish-yellow, light-red, salmon-red, or streaked yellow and red, heavy but friable sandy clay subsoil. The subsoil is intermediate in color between the bright red of the Cecil and the yellow of the Durham. This series is derived from granite and gneiss. The Appling sandy loam and fine sandy loam are mapped in this county.

The Davidson series includes types having brownish-red to dark-red surface soils and a deep-red or maroon-red, smooth, compact clay subsoil. The soils are derived from dark-colored rocks, such as diorite and diabase. One type, the Davidson clay loam, is developed in this county.

The types included in the Iredell series have brown to dark-colored surface soils and a yellowish-brown or dingy brownish yellow to greenish-yellow, extremely plastic, waxy, and impervious clay subsoil, which grades into the greenish rotten parent diorite rock at depths of 20 to 36 inches. The Iredell series is represented in Durham County by one type, the Iredell loam.

The types of the Mecklenburg series have brown to reddish-brown surface soils and a reddish-yellow, yellowish-brown, or ocherous-colored, sticky, waxy clay subsoil. This series is closely related to the Iredell series and occupies an intermediate position, with respect to color and stage of decomposition or weathering of material, between the Iredell and Davidson series. The soils are derived from diorite, gabbro-diorite, diabase, and similar rocks. One type, the Mecklenburg loam, is mapped.

The types of the Wilkes series have grayish, brownish, or grayish-yellow surface soils, a pale-yellow, compact subsurface layer, and a yellow and gray to reddish-yellow, tough, plastic sandy clay to clay subsoil, with intrusions of Iredell material consisting of dingy-drab waxy clay. This series is derived from a mixture of rocks consisting of aplitic granite, laminated light-colored gneiss, and hornblende schist, which are cut by dikes of diabase or diorite. Only the fine sandy loam of the series is developed in Durham County.

The Conowingo series includes types with light-yellow or dull-yellow to whitish surface soils and a dingy-yellow to yellowish-brown, tough plastic, waxy clay subsoil. This series is derived from medium dark colored, quartz-free, igneous rocks, such as serpentine, steatite, epidote, talcose and chloritic schist, usually associated with slate. One type, the Conowingo silt loam, occurs in this county.

The types of the Altavista series have grayish-yellow to brownish-yellow surface soils and a yellow compact sandy clay subsoil. These soils are developed on the second bottoms or terraces and are usually well drained. The Altavista fine sandy loam is mapped.

The types of the Congaree series have brown to reddish-brown surface soils and a brown or chocolate-brown to light-brown subsoil. The series occurs in the first bottoms. The Congaree silt loam is recognized in this survey.

In the following pages of this report the soil types are described in detail. The accompanying soil map shows their distribution. The table following gives the actual and relative extent of each of the types mapped:

*Areas of different soils.*

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
White Store fine sandy loam.....	26,240		Davidson clay loam.....	4,224	2.3
Shallow phase.....	21,184	25.5	Altavista fine sandy loam.....	4,160	2.2
White Store sandy loam.....	29,312	15.7	Cecil fine sandy loam.....	2,688	1.4
Georgeville silt loam.....	24,320	13.6	Wilkes fine sandy loam.....	2,432	1.3
Gravelly phase.....	1,024		Appling fine sandy loam.....	2,112	1.1
Congaree silt loam.....	15,744	8.5	Cecil gravelly fine sandy loam.....	1,536	.8
Alamance silt loam.....	11,968	6.4	Appling sandy loam.....	1,280	.7
Granville sandy loam.....	10,880	5.8	Durham sandy loam.....	1,216	.7
Iredell loam.....	8,832	4.7	Alamance very fine sandy loam.....	768	.4
Granville fine sandy loam.....	5,568	3.0	Mecklenburg loam.....	704	.4
Durham fine sandy loam.....	5,184	2.9			
Conowingo silt loam.....	4,864	2.6	Total .....	186,240	.....

## WHITE STORE SANDY LOAM.

The surface soil of the White Store sandy loam is a gray or pale-yellowish to yellowish-brown medium sandy loam, passing into a yellowish sandy loam at 2 to 6 inches. The subsoil beginning at 8 to 12 inches is a dull-red or brownish-red, stiff, plastic clay or a sticky, plastic clay, mottled with gray, red, purple, and whitish colors. In places it is bluish gray in the lower part of the 3-foot section. On exposure to the air the subsoil breaks down into cubical fragments. As mapped the type includes small patches of the fine sandy loam and clay loam, the Granville sandy loam, and the Wadesboro sandy loam, which would have been mapped separately if they had been larger.

The type is scattered over the south-central and eastern parts of the county. A continuous body lies along the Oxford branch of the Southern Railway from Durham to beyond Gorman. Another area extends from just south of Bilboa northeast nearly to the Neuse River. Numerous smaller bodies are scattered throughout the east-central part of the county.

The topography is nearly flat to undulating and gently rolling. The surface is probably smoother than that of the White Store fine sandy loam. The type occupies the higher and smoother positions, mainly as interstream areas in the Triassic section, where the surface soil has not been washed off. The surface drainage is good. On the slopes the run-off is excessive, and "gall" spots and gullies are formed where no terraces are used, especially when cultivated crops, like tobacco, corn, and cotton, are grown. On the more level areas the water percolates slowly through the dense clay subsoil, but artificial drainage is seldom necessary.

The White Store sandy loam is the most extensive and important soil type in the central, eastern, and southeastern parts of the county. About 40 to 60 per cent is being cultivated; the rest supports a growth of oaks, pine, maple, cedar, and old-field pine.

Tobacco and corn are the important crops. Cotton is grown to some extent. Other crops grown on this soil for use on the farm and for soil improvement are oats, sweet potatoes, vegetables, rye, clover, vetch, soy beans, cowpeas, watermelons, and cantaloupes. Hogs and cattle are raised on every farm for home consumption, and the surplus is sold on the local market. Some poultry and eggs are sold every

year. Tobacco yields from 350 to 800 pounds, and corn, 10 to 30 bushels per acre. Cotton, when grown, yields from one-fifth to one-half bale per acre.

The soil of this type is easy to handle. It is usually broken with light one-horse and two-horse turning plows and cultivated with one-horse cultivators, sweeps, shovels, and weeders. At present the crops are generally ridged up, but some farmers are beginning to use flat cultivation except in the more poorly drained areas.

Commercial fertilizers are in general use. Tobacco usually receives from 400 to 1,000 pounds of an 8-2-2 or 8-3-3 mixture, corn 200 to 300 pounds, and cotton 400 to 600 pounds. When corn is grown after cowpeas, clover, soy beans, or rye, the application of fertilizer is usually light.

The present (1920) value of land of this type ranges from \$40 to \$250 an acre.

The principal need of the White Store sandy loam is the addition of organic matter. This may be done by applying barnyard manure or by growing and turning under clover and other legumes, such as cowpeas, soy beans, and vetch. Cover crops should be grown during the winter season. Rye and crimson clover answer well for this purpose.

The table below gives the results of mechanical analyses of samples of the soil and subsoil of the type:

*Mechanical analyses of White Store sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
235637.....	Soil	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
235638.....	Subsoil	3.1 .3	15.3 2.7	10.2 1.3	30.0 5.7	17.7 8.0	18.2 38.7	5.7 43.6

WHITE STORE FINE SANDY LOAM.

The surface soil of the White Store fine sandy loam is a light grayish brown, pale yellowish brown, dull-brown or dull-red fine sandy loam, normally passing at 2 to 6 inches into a yellow fine sandy loam. The subsoil is a dull-red, brownish-red, or Indian-red, heavy, plastic, sticky, clay, passing in many places into bluish-gray material at lower depths. Grayish, yellowish, whitish, and purplish colors generally occur in the lower subsoil and substratum. Locally the upper subsoil is mottled with gray and yellow and the lower part with dull red, Indian red, or bluish gray.

The type as mapped includes patches of White Store sandy loam and White Store fine sandy loam, shallow phase, and spots of White Store clay loam, where the surface soil has been removed and the red clay loam exposed. Small bodies of Granville fine sandy loam are also included.

The White Store fine sandy loam occurs in large areas in the southern half of the county. The more important of these lie south of Bethesda School, south of Berea Church, near Patrick Henry School, and north and south of Ephesus Church.

This type occupies nearly flat and gently rolling interstream areas and gentler slopes where the surface soil has not been washed off. Surface drainage is good. Water passes through the dense clay subsoil very slowly, but ditching is rarely necessary.

The White Store fine sandy loam is one of the important soils of the county. About 60 per cent of it is under cultivation. The rest is forested with white oak, red oak, black oak, hickory, maple, dogwood, and pine.

Tobacco, corn, sweet potatoes, and cotton are the chief crops. Oats, cowpeas, soy beans, rye, and clover are grown on most farms. Tobacco yields from 300 to 700 pounds, corn 10 to 23 bushels, sweet potatoes from 90 to 250 bushels, and cotton one-fifth to one-half bale per acre.

This type where the surface soil has a depth of 8 to 12 inches is fairly well adapted to bright-leaf tobacco. The yields are lighter on this type than on the Granville and Durham soils.

Under the prevailing system of farming land of this type is given only fair management. The plowing performed with one-horse plows is shallow. Cultivation is with light implements, usually shovels and sweeps. Little attention is given to the rotation of crops, but a few of the farmers grow cowpeas and soy beans in connection with corn or sale crops. On a few large farms on this soil, handled by their owners, modern methods and machinery are used and here the yields obtained are much better than the average.

Fertilizers are in common use. Tobacco usually receives 400 to 1,000 pounds per acre of an 8-2-2 or 8-3-3 mixture. Corn and cotton are fertilized to less extent. Liberal applications of barnyard manure and about 200 pounds of fertilizer are used for sweet potatoes.

This type sells at \$40 to \$150 an acre, according to location, smoothness of surface, and improvements.

White Store fine sandy loam erodes easily, and this tendency is a serious hindrance to cultivation of the more sloping areas. These should be properly terraced to prevent the formation or extension of gullies. The more general use of cover crops, such as clover, vetch, rye, or other small grains, is also recommended as a means of preventing losses from erosion. More livestock should be raised and the manure spread over the patches where the surface soil has been removed.

*White Store fine sandy loam, shallow phase.*—The surface soil of the White Store fine sandy loam, shallow phase, is a pale-yellowish to reddish-brown or dull-reddish loam to clay loam, passing at 2 to 5 inches into a dull-red or brownish-red to Indian-red, heavy, sticky clay. The subsoil of this phase is essentially the same as that of the White Store fine sandy loam. The color of the upper subsoil is usually dull red passing into a purplish or Indian red and then into a bluish gray, or the subsoil may be mottled with whitish, grayish, yellowish, and purplish colors. This soil is sticky when wet and is inclined to harden when dry. On exposure to the air the subsoil crumbles into small roughly cubical fragments.

With this phase are included small areas of the sandy loam, shallow phase, the fine sandy loam, and the sandy loam of the White Store series. A small area of the Penn clay loam and patches of Wadesboro soils, which were too small to show on a map of the scale used in this survey, have also been included.

The shallow phase is developed around the heads of draws and streams and on the slopes bordering the streams in the southern and southeastern parts of the county. The largest areas lie east and north of Lowes Grove Farm Life School, south of Page School, and around the head of Third Fork Creek near Durham. Numerous bodies are scattered elsewhere in the southern part of the county. The surface is mainly rolling, ranging to steep and broken along some of the streams. Most of this land has been allowed to wash and gully to such an extent that it can not be cultivated. The surface drainage is excessive on all the slopes, and the run-off is causing a rapid extension of the gullies. In contrast the underdrainage is deficient, water passing so slowly through the dense subsoil that the land can not be cultivated for several days after heavy rains.

The White Store fine sandy loam, shallow phase, although rather extensive in the southern half of the county, is agriculturally of very little importance. At present, probably less than 5 per cent of this phase is under cultivation. At one time a large proportion of the phase was in cultivation. Probably 50 years ago much of it was the typical fine sandy loam, but careless cultivation and consequent erosion and gulling caused abandonment of the fields and their reversion to forest. The pines that took possession of this land have grown rapidly and in recent years have been the source of considerable lumber, which probably is the best crop for this phase. It is the least important soil in the county, from the point of view of the farmer, owing mainly to its locally eroded and gullied condition, although there are a few areas that produce well.

Corn, cotton, wheat, and oats are the principal crops. Cowpeas, soy beans, and clover are grown to some extent. Crop yields are not as high on this soil as on the typical White Store fine sandy loam and the soil is more difficult to cultivate. The methods of handling and fertilizing the phase are about the same as on the typical soil.

This land sells for \$15 to \$50 an acre. Near towns where it is used for building sites and gardening, prices are somewhat higher and when sold in connection with the fine sandy loam they range from \$30 to \$100 an acre.

More livestock could be kept and the manure used profitably. Increasing the supply of organic matter by growing more legumes, deeper plowing, and the liberal use of lime would probably give better results than commercial fertilizers alone.

#### GRANVILLE SANDY LOAM.

The surface soil of the Granville sandy loam is a gray to light-brown or yellowish-brown medium sandy loam, grading at about 4 to 6 inches into a pale-yellow sandy loam, which extends to a depth of 9 to 12 inches. The subsoil is a yellowish friable sandy clay, which in the lower part is stiff and somewhat plastic and mottled with red and gray. In a few places spots of Indian-red clay appear within the lower part of the 3-foot section.

Included with this type as mapped are a few patches of gravelly soil, the gravel consisting mostly of quartz. The most prominent area of this kind lies about 1 mile west of Fish Dam Bridge. Some spots of Granville coarse sandy loam and fine sandy loam and of White Store soils too small to map separately are also included.

The small area lying northeast of Redwood includes some coarse sandy loam along the county line. This material was mapped Granville coarse sandy loam in Wake and Granville Counties.

The Granville sandy loam occurs mainly in the east-central part of the county. The largest areas lie one-half mile southeast of Andrews Chapel, 1 mile southwest of Fish Dam Bridge and in the vicinity of Fairntosh. Smaller areas are scattered throughout the sandstone belt.

The type occupies the divides with an undulating or gently rolling to rolling surface, becoming strongly rolling in narrow strips bordering the streams. It is closely associated with the White Store sandy loam. Natural drainage is good on most of the type.

The Granville sandy loam, although not extensive, is considered a valuable soil and much of it is in cultivation. The area southeast of Fairntosh has a good forest growth, mostly oaks and pine.

This type is prized highly for the production of bright-leaf tobacco and is used chiefly for this crop, though corn and cotton are of considerable importance. Oats, wheat, rye, clover, melons, vegetables, cowpeas, soy beans, and sorgo are also grown, mainly for home use. A few hogs and cattle are raised on all farms. Tobacco yields 400 to 700 pounds, corn 15 to 30 bushels, cotton one-fourth to two-thirds bale per acre.

Shallow plowing with one-horse plows is the general practice. Commercial fertilizers are depended upon almost entirely to maintain the yields. Tobacco receives from 500 to 1,000 pounds of an 8-2-2 or 8-3-3 mixture per acre, a smaller quantity being used for cotton, and still less for corn.

The price of land of this type ranges from about \$40 to \$100 an acre, depending upon location, forest growth, transportation facilities, and improvements.

This soil can be kept in a productive condition by growing cowpeas, soy beans, rye, and clover, and increasing the supply of organic matter by turning under occasionally some of these crops for green manure. Good yields are obtained by making heavy applications of commercial fertilizer. Fertilizer is, without doubt, best for bright tobacco, but its use alone is less likely to result in permanent improvement of the soil than a system of management in which crop rotation and the maintenance of the supply of organic matter receives more attention.

#### GRANVILLE FINE SANDY LOAM.

The surface soil of the Granville fine sandy loam is a gray to brownish-yellow fine sandy loam, with a depth of about 5 inches, where it is normally underlain by a few inches of yellowish fine sandy loam. The subsoil is a yellow friable fine sandy clay, which in many places passes at 25 to 30 inches into a stiff rather plastic yellow clay, mottled with red and gray or yellow and gray. Locally the lower part of the subsoil has a red or Indian-red color, like that of the Penn soils. The surface soil in cultivated fields is brownish in color, while in virgin areas the surface layer, a few inches thick, is dark gray and underlain by a layer of light yellowish brown. Owing to the open nature of this soil, it can be cultivated soon after rains, except in some of the flats.

This type occupies the more nearly level areas of the divides and narrow strips bordering the stream courses. It occurs in small areas scattered over the sandstone belt. The larger of these are along the Wake County line in the southeastern part of the county, in the vicinity of Fairntosh, and bordering the bottoms on the west side of Newhope Creek and the east side of Little Creek.

The topography is undulating or gently rolling to rolling and in a few places nearly flat. The drainage is good, except in some of the flat spots.

This type is not extensive in the county, but is of considerable importance and is largely under cultivation. Its general use is for the production of tobacco, together with some corn and cotton. The yields, methods of handling, and fertilizer practices are the same as on the Granville sandy loam, and the type can be improved by the methods recommended for that type.

Land of this type is commonly sold with adjoining soil at prices ranging from \$40 to \$100 an acre.

#### GEORGEVILLE SILT LOAM.

The surface soil of the Georgeville silt loam is a grayish-yellow, light-brown, or yellowish-red silt loam, passing at 3 to 6 inches into a reddish-yellow to yellowish-red or red, rather compact silty clay loam, which extends to a depth of 8 to 12 inches. Typically the subsoil is a light-red silty clay loam, grading into a dull-red or bright-red brittle silty clay in the lower part. The greater part of this type has slate and quartz rock, small slate fragments, and quartz gravel scattered over the surface and mixed with the soil, but not in sufficient quantities to make it a stony or gravelly type. In many of the cultivated fields the surface soil is yellowish red, and on some of the slopes the soil mantle has been washed off, exposing the red silty clay loam. In other places the top soil is light grayish and the subsoil is a yellowish-red or salmon color. Patches of Georgeville silty clay loam and Alamance silt loam, too small to be shown on the map, were included with this type.

The Georgeville silt loam is rather extensive in the northwestern part of the county. The largest area is an almost continuous body from one-half mile to 3 miles wide, extending for about 6 miles along the Roxboro Road from Holt School to Quail Roost. Other areas are situated around Rougemont, around South Lowell School, in the vicinity of Rivermont Springs, and east and south of Ellis Chapel. The topography is generally rolling, but near Eno, Little, and Flat Rivers it is strongly rolling to steep and broken. The drainage is well established in both soil and subsoil. The type can be cultivated without much danger of erosion, and as a rule it is deep and retains moisture well.

The Georgeville silt loam is one of the most important soils of the county and much of it is under cultivation. Uncleared areas support a forest of white oak, red oak, post oak, shortleaf pine, poplar, hickory, dogwood, maple, and sourwood, together with some cedar and old-field pine. Some of the forested and cleared areas are used for pasture.

Corn, wheat, clover, and oats are the principal crops. Tobacco and cotton also are grown. The corn, clover, and oats are generally fed to work stock. Wheat is usually made into flour for home consumption, and the surplus sold on the local market. Cowpeas, rye, and soy beans are grown mainly as soil-improvement crops, and are usually turned under. Tobacco is grown as a cash crop on some of the lighter colored areas. Sweet potatoes, potatoes, garden vegetables, apples, and peaches give good yields. These products are generally consumed on the farm.

Wheat yields from 8 to 15 bushels, corn 15 to 50 bushels, oats 15 to 40 bushels, clover 1 to 2 tons of hay, and cotton one-quarter to three-quarters bale per acre. Tobacco grown on this type does not cure to as bright color as that grown on sandy soils, but gives larger yields.

The better farmers plow deep and prepare the seed bed carefully, whereas the majority of them plow shallow and make poor preparation for planting. Commercial fertilizer is applied on nearly all the crops, ready-mixed fertilizer of an 8-2-2 or 8-3-3 formula being in general use. Corn, wheat, and oats as a rule receive an application of 200 to 300 pounds, cotton 400 to 600 pounds, and tobacco 500 to 1,000 pounds. Lime is generally used on clover.

Land of this type sells for \$30 to \$150 an acre, depending on the state of improvement, topography, and nearness to shipping points.

The Georgeville silt loam is recognized as one of the best soils in the county, especially for corn, wheat, oats, and clover. Cotton also does well on this type. The soil is deficient in organic matter, but by growing cowpeas, soy beans, and clover and deeper plowing it can be brought up to and maintained in a high state of fertility. A deeper seed bed should be made for all crops by breaking the land a little deeper each year. Turning under clover sod, cowpea vines, and rye and applying liberal quantities of burnt lime just before plowing improve the structure of the soil and increase the yields considerably. A systematic rotation of crops is one of the principal needs on this type.

Areas of a stony variation of this type are shown on the soil map by stone symbols. This stony land differs from the typical silt loam in that it carries an abundance of slate and quartz fragments, ranging in size from small angular pieces to large stones, scattered over the surface and distributed throughout the soil. The largest patches of this land occur near Tilley Mill, around Red Mountain, near South Lebanon School, and near Mount Lebanon Church. They occupy chiefly the rolling ridges and rolling to broken slopes, and consequently are well drained. They are of small extent and used mainly for forest and pasture land. The forest growth is the same as on the typical soil, and the few spots under cultivation give about the same results, though the stones make plowing and other cultural operations more difficult.

*Georgeville silt loam, gravelly phase.*—The gravelly phase of the Georgeville silt loam is indicated on the soil map by gravel symbols. It differs from the typical soil in that there is scattered over the surface and mixed with the soil 10 to 40 per cent of brown to red rounded gravel and angular slate fragments.

The Georgeville silt loam, gravelly phase, occurs in a few small areas lying south, east, and west of Reservoir School, and north and northeast of the Durham pumping station. The areas commonly

occupy interstream areas and slopes leading toward the streams and have a gently rolling to rolling topography. Most of this land is well drained and suited to general farming, and more than half of it is under cultivation. The forest growth is the same as on the Georgeville silt loam.

Corn, cotton, wheat, and clover are the main crops, but cowpeas, rye, sorghum, sweet potatoes, and garden vegetables are also grown. The farm practices, yields, and methods of improvement are practically the same as for the Georgeville silt loam.

ALAMANCE VERY FINE SANDY LOAM.

The surface soil of the Alamance very fine sandy loam is a grayish-yellow to brownish-yellow very fine sandy loam, 5 to 9 inches deep. The subsoil is a yellow friable very fine sandy clay to silty clay. Rounded pebbles and angular quartz gravel are scattered over the surface, but not in quantities large enough to make this a gravelly type.

The Alamance very fine sandy loam is developed in a few small areas in the northeastern part of the county. The larger of these are situated on the Person County line, 3 miles northeast of Mangum School, one-half mile south of Hamptons Store, 1 mile south of Mangum Store, and one-half mile north of Mount Level Church. The type has a nearly level to gently rolling surface and most of it is fairly well drained.

Owing to its small extent, this type is unimportant. About half of it is under cultivation. Corn and tobacco are the principal crops. Corn yields 20 to 35 bushels, and tobacco from 500 to 800 pounds per acre. Wheat, oats, cowpeas, crimson clover, rye, and vegetables also are grown. These crops give fair yields.

This soil responds to the same fertilizer treatment and other management features and requires the same steps for its improvement as the Durham fine sandy loam, with which it is closely associated.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the type:

*Mechanical analyses of Alamance very fine sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
235610.....	Soil.....	Per cent. 1.6	Per cent. 4.5	Per cent. 3.5	Per cent. 24.2	Per cent. 25.0	Per cent. 34.0	Per cent. 7.5
235611.....	Subsoil.....	.9	2.6	1.6	9.5	12.5	42.6	30.4

ALAMANCE SILT LOAM.

The surface soil of the Alamance silt loam is a light-gray or yellowish-gray to almost white floury silt loam, passing at 2 to 5 inches into a pale-yellow silt loam which extends to a depth of 6 to 9 inches. The subsoil is a yellow, compact, brittle, silty clay loam, containing occasional small fragments of yellowish and reddish partly decomposed slate, and showing in places in the lower part splotches of rather tough gray clay. In many places the dry surface soil in cultivated fields has a whitish color, and in virgin areas the surface layer of 2 or 3 inches is grayish brown to brownish yellow. In flats and depressions the subsoil is mottled with gray and is a rather tough clay below

30 inches, while in the higher and better drained areas it is mottled with red. In dry weather the surface soil, owing to its low content of organic matter and its silty texture, compacts badly. Slate fragments and gravel are scattered over the surface and mixed with the soil, but not in sufficient quantity to give a gravelly or stony type.

The Alamance silt loam is scattered over the northwestern part of the county. The largest areas lie east of Holt School, west of Quail Roost, near Lyndover, east of Hamptons Store, and in an irregular almost continuous strip along the west side of the county, from a point just south of Rose of Sharon Church nearly to Rougemont. Smaller areas occur throughout the slate belt.

The topography is level to undulating or rolling. After rainy periods water stands on the surface of the level areas, and drainage by open ditches or tiling is necessary. The undulating and rolling areas are usually well drained. This soil can be farmed every year, although heavy rainfall in the spring causes late planting on the more level land.

About one-fourth of the type is cultivated; the rest is forested with white, black, red, and post oaks, hickory, dogwood, poplar, maple, and some cedar and old-field pine. Tobacco, corn, and wheat are the principal crops, but oats, clover, and cotton, with some cowpeas and rye, are grown. Tobacco yields 400 to 800 pounds, corn 15 to 35 bushels, and wheat 6 to 12 bushels per acre.

Shallow plowing with one-horse plows prevails. On some of the better farms heavy-work stock and tractors are used for breaking and cultivating, deeper plowing is practiced, and larger returns are obtained from the land. In many places the type is farmed in connection with the Georgeville silt loam and receives the same cultivation and fertilizer treatment.

This type at present (1920) sells for \$30 to \$100 an acre. It is usually sold with the Georgeville silt loam.

The Alamance silt loam is deficient in organic matter. According to experiments and the experience of the farmers, this can probably be best supplied by growing and plowing under such crops as soy beans, cowpeas, and clover. This also will improve the structure of the soil. This soil can be made to yield as much as 1,000 pounds of tobacco, 50 bushels of corn, 18 bushels of wheat, and 1 bale of cotton per acre. The liberal use of lime has proved beneficial. In Stanley County clover does well on this type.

#### DURHAM SANDY LOAM.

The surface soil of the Durham sandy loam is a light-gray to dark-gray medium sandy loam underlain at 2 to 6 inches by a pale-yellow to yellow sandy loam. The subsoil beginning at 12 to 18 inches is a deep-yellow friable sandy clay to clay. Occasional faint-red mottlings appear in the lower part of the 3-foot section, and in a few nearly level spots the lower part of the subsoil is mottled with gray. Small patches of Wilkes sandy loam and Appling sandy loam are included with this type.

The Durham sandy loam occurs in a few small areas in the western and northeastern parts of the county, two of the larger areas lying north and west of Whites School and several smaller areas in the vicinity of Willardville. This type occupies nearly level to gently rolling areas. The surface and internal drainage are prevailingly good.

Most of this type is under cultivation. The part not farmed is in a forest of oaks, hickory, shortleaf pine, dogwood, maple, persimmon, and old-field pine. The land is held in high esteem for the production of bright-leaf tobacco and is used chiefly for this crop. Corn, rye, and garden vegetables do well.

Tobacco yields from 600 to 1,000 pounds per acre, with an application of 500 to 1,000 pounds of an 8-2-2 or 8-3-3 fertilizer. Corn yields from 16 to 35 bushels per acre. The largest yields are obtained on land on which cowpeas or rye have been turned under. From 200 to 300 pounds of commercial fertilizer is used.

Land of this type sells at \$40 to \$75 an acre, depending upon the state of improvement and nearness to good roads.

#### DURHAM FINE SANDY LOAM.

The surface soil of the Durham fine sandy loam consists of 2 to 6 inches of gray to grayish-yellow fine sandy loam, passing into a yellow or pale-yellow fine sandy loam which extends to a depth of 8 to 15 inches. The subsoil is a friable yellow fine sandy clay of compact structure. In places the lower subsoil is mottled with gray or whitish colors in the poorly drained areas and with red in the better drained areas. In some places the surface soil is underlain by a pale-yellow compact fine sandy loam, from about 8 inches to 12 or 15 inches. Locally the lower part of the subsoil is a mottled yellow and gray, tough, plastic fine sandy clay, resembling the Wilkes subsoil. Outcrops of granite are numerous.

This type is confined almost entirely to the northeastern and northwestern parts of the county. A small area lies 1 mile east of the intersection of Eno and Flat Rivers, and several others along the Granville County line, and in the vicinity of Rougemont.

The Durham fine sandy loam occupies crests of divides and undulating or gently rolling to rolling country, and is normally well drained. Most of it lies well for farming and is suited to the production of bright tobacco. About three-fourths of the type is under cultivation. The forest growth consists of oaks, dogwood, hickory, maple, and old-field pine. This is not an extensive type, but it is considered important. Tobacco and corn are the principal crops. Rye, sweet potatoes, cowpeas, clover, and cotton are grown to some extent. Garden vegetables of all kinds do well. Apples, peaches, pears, grapes, and strawberries are grown for home use.

This type is especially adapted to the production of bright-leaf tobacco and is used chiefly for this crop. Heavy applications of fertilizer are made for this crop. The yields range from 600 to 1,000 pounds per acre. Corn yields 15 to 30 bushels and cotton from one-quarter to three-quarters bale per acre.

The methods of handling this soil and the quantities and kinds of fertilizer used are the same as on the Appling fine sandy loam. The land has practically the same value and responds to the same means of improvement. The soil warms up quickly in the spring and permits early planting.

#### APPLING SANDY LOAM.

The surface soil of the Appling sandy loam is a gray to yellowish-brown sandy loam, with a depth of 5 to 10 inches. The subsoil is a salmon-red or yellowish-red streaked with red and yellow, friable

sandy clay to stiff clay. The subsoil presents all shades of color from red to yellow. A few "gall spots" of pale-red or salmon-red clay are developed on some of the slopes where the surface soil has been removed by wash. The soil of this type in this county differs from the same type in other counties in that the surface soil rests directly on the heavy clay subsoil, the intermediate or subsurface layer being lacking. In a few places, however, there is a pale-yellow subsurface layer. Small patches of Appling gravelly loam and coarse sandy loam and of Cecil sandy loam and Durham sandy loam, too small to map separately, are included with the Appling.

The Appling sandy loam is not extensive in Durham County and is not important agriculturally. The largest area, which lies 2 miles east of the Bahama Farm Life School, on the south side of Flat River, is rolling to steep and hilly. Other bodies, situated north of Rogers Store along Lick Creek and about 6 miles west of Durham, near the Orange County line, are nearly level to rolling. Natural drainage is good. On the steeper slopes erosion has kept pace with the weathering of the underlying rocks. Granite outcrops appear here and there on the slopes.

Nearly all the smoother land of this type is under cultivation; the rest supports a growth of small trees, mostly old-field pine. This soil is used mainly for the production of bright-leaf tobacco, corn, cotton, and sweet potatoes. Vegetables and fruits are grown for home use. The yields and fertilizer treatment are about the same as on the Appling fine sandy loam, and the soil responds to the same methods of improvement. The price of this land is \$30 to \$100 an acre.

#### APPLING FINE SANDY LOAM.

The surface soil of the Appling fine sandy loam is a light-gray to yellowish-gray mellow fine sandy loam which passes at 4 to 8 inches into a yellow compact fine sandy loam extending to a depth of 7 to 14 inches. The subsoil, beginning at depths of 10 to 14 inches, is a yellowish-red, streaked with red and yellow, friable fine sandy clay to rather stiff clay. On some of the slopes near stream courses the salmon-red or pale-red sandy clay subsoil is exposed, causing the so-called "gall spots."

This type occurs in the northeastern part of the county. The largest areas lie along Dial Creek, east of Mangum School, and along Camp Creek and Flat River. A few interstream areas are situated about 1 mile north and  $1\frac{1}{4}$  miles southwest of Mangum School, one-half mile east of Bahama, and about 2 miles southeast of Quail Roost.

The topography is nearly level to gently rolling on the divides and rolling to broken as the streams are approached. Owing to the friable nature of the soil and subsoil and its sloping surface, the natural drainage is good. In the more rolling and broken areas the run-off is excessive, causing slight gullying and erosion.

The type is not very extensive in this county, but is important. Much of it is under cultivation; the rest is forested with oaks, pine, hickory, poplar, dogwood, and some old-field pine, cedar, persimmon, and locust.

Tobacco, corn, and cotton are the leading crops. Rye, clover, wheat, sweet potatoes, garden vegetables, and fruits do well, but are grown mainly for home use. Tobacco, the chief cash crop, yields from 600 to 1,200 pounds per acre. Corn yields 20 to 40 bushels, cotton one-fourth to 1 bale per acre.

Shallow breaking and cultivation are generally practiced. Some farmers sow rye and crimson clover as cover crops and turn them under for green manure. Corn or cotton is usually planted after a crop of cowpeas, crimson clover, or rye has been turned under. Cowpeas and rye are sometimes sown in the corn, cotton, and tobacco fields after the crops have been taken off.

Fertilizer applications for tobacco range from 600 to 1,000 pounds per acre; for corn 200 to 300 pounds, and for cotton 400 to 600 pounds per acre. The prevailing mixtures have the formulas 8-2-2 and 8-3-3. A homemade mixture of cottonseed meal and acid phosphate is used on a few farms for corn and cotton. Nitrate of soda is used to some extent on corn, cotton, and small grain.

The Appling fine sandy loam sells at \$40 to \$100 an acre, depending on its location, topography, and state of improvement.

This soil is deficient in organic matter. Deeper plowing, turning under rye, clover, and cowpeas, and adding lime would improve its physical condition and increase its productiveness in other ways.

#### CECIL GRAVELLY FINE SANDY LOAM.

The surface soil of the Cecil gravelly fine sandy loam consists of a grayish-brown to slightly reddish brown fine sandy loam to sandy loam, with a depth of about 5 to 8 inches, containing a large quantity of small quartz gravel and angular quartz fragments. The subsoil is a red, stiff, but fairly brittle clay extending to a depth of 3 feet or more. On some of the slopes where erosion has been quite active the red clay is exposed, forming the so-called "gall spots."

Along the Wake County line, both north and south of Rogers Store, are very narrow strips of Cecil gravelly clay loam. These areas are so small that they have been included with the Cecil gravelly fine sandy loam.

The Cecil gravelly fine sandy loam is inextensive. It is mapped in one area along the Wake County line. The area varies from one-quarter to three-quarters mile in width and is about 5 miles long. The southern half of this area lying south of Rogers Store occupies a ridge or divide with a gently rolling to rolling surface; the northern part occupies rolling to hilly land overlooking the streams.

On account of the large proportion of gravel, the Cecil gravelly fine sandy loam is not as easy to cultivate as the Cecil fine sandy loam, but with proper machinery it can be tilled without very much trouble. This hindrance to cultivation is offset in part by the action of the gravel in preventing erosion. A good deal of this type is under cultivation; the rest supports a forest growth of oaks, hickory, dogwood, and old-field pine.

Cotton, wheat, and corn are the principal crops; sweet potatoes, garden vegetables, apples, peaches, pears, and grapes are grown for home use. Cotton yields from one-half to 1 bale, wheat 8 to 12 bushels, corn 15 to 30 bushels, and sweet potatoes 75 to 175 bushels

per acre. Fall-sown oats give good yields. Clover does well. Cotton usually receives 300 to 500 pounds of an 8-2-2 fertilizer per acre, corn about 200 to 300 pounds, and wheat and oats 200 to 400 pounds per acre.

This land brings \$30 to \$80 an acre.

Commercial fertilizer seems to be essential on this soil. The application of lime and turning under cowpeas, soy beans, and clover also are beneficial.

#### CECIL FINE SANDY LOAM.

The surface soil of the Cecil fine sandy loam consists of a grayish-brown to light-brown loamy fine sand to light fine sandy loam ranging in depth from 5 to 9 inches. The subsoil varies from light-red to red, stiff, brittle clay extending to a depth of 3 feet or more. On some of the knolls and slopes the surface sandy material has been washed away, leaving the red clay exposed. Locally quartz gravel and fragments of the parent rock appear on the surface, but these are not in sufficient quantity or spread over areas large enough to be represented on the map as a gravelly or stony type.

Included with this type are two or three small spots of Cecil sandy loam. These occur in the eastern part of the county; one of them lies about one-half mile northeast of Mount Level Church, on the Granville County line. This soil differs from the fine sandy loam in that the surface layer contains more of the medium to coarse sand particles. The agricultural value of these coarser spots is not materially different from that of the typical soil and, owing to their very small extent, no attempt was made to separate them from the fine sandy loam.

The Cecil fine sandy loam is inextensive and is confined mainly to the northeastern part of the county. The most important area is a narrow strip extending from about 1 mile northeast of Bahama northward nearly to the Person County line and averaging about one-half mile in width. Other bodies lie 1 mile northwest of Bahama, 1½ miles east of Bowlings Lower Mill, 1 and 3 miles south of Mangum School, one-half mile north of Mangum Store, and along Camp Creek.

The topography is gently rolling away from the streams to rolling to steep on the slopes approaching the streams. The surface drainage is well established, and on some of the slopes the run-off is so rapid as to cause erosion.

Ordinarily the type is easy to handle. About 40 per cent of it is under cultivation. The forest growth consists of oaks, poplar, hickory, maple, dogwood, and old-field pine. Corn, cotton, and wheat are the principal crops. Oats, cowpeas, clover, sweet potatoes, peas, soy beans, and late vegetables do well. Tobacco produces well in the deeper areas of this soil, but the leaf is not quite as bright in color when cured as that grown on the lighter soils. Corn yields 15 to 40 bushels, cotton one-third to 1 bale, and wheat 8 to 15 bushels per acre. Tobacco yields from 600 to 1,100 pounds per acre, but it does not bring as high prices as that of lighter color.

This soil responds to the methods of cultivation and improvement practiced on the associated Appling fine sandy loam.

Land of this type sells at \$45 to \$100 an acre. It is rarely sold alone.

## DAVIDSON CLAY LOAM.

The Davidson clay loam consists of a reddish-brown to dark-red clay loam, underlain at about 5 to 9 inches by a deep-red or maroon-red, stiff, smooth clay extending to a depth of 3 feet or more. Some areas include patches where the surface soil has been washed off, leaving the red clay exposed. The type includes small areas of Georgeville silt loam, not shown on the map. In places fragments of diorite or of other dark-colored rocks are scattered over the surface, but not in great quantities. Locally this type is known as "red push-land."

The Davidson clay loam is of relatively small extent in this county, but is an important type agriculturally. It is confined mainly to the northwestern quarter of the county. The largest areas lie around Quail Roost, along Flat River to the Person County line, 1 mile west of Rivermont Springs, and along Eno River. Several areas are situated along the Orange County line, north of the Eno River and along Little River. A few other small areas are scattered over the northern half of the county.

The topography is gently rolling or rolling to strongly rolling. The strongly rolling areas occur on the slopes approaching the larger streams. The natural drainage is good. In a few places the surface soil has been entirely removed by wash.

The Davidson clay loam is a good soil and much of it is under cultivation; the rest is forested to white, red, black, and post oaks, pine, dogwood, hickory, maple, and poplar, and some old-field pine and cedar. There is some merchantable timber on small areas of the type.

Corn, wheat, oats, and clover are the principal crops, with some cotton and alfalfa. Clover, cowpeas, and alfalfa are grown for hay and for soil improvement. Corn yields from 25 to 50 bushels, wheat 8 to 20 bushels, and oats 20 to 40 bushels per acre. Cotton, not now grown extensively, gives fair yields, and alfalfa does well. Garden vegetables, sweet potatoes, sorghum, vetch, grapes, peaches, and apples are grown successfully.

This soil is handled practically the same as the Georgeville silt loam. Some farmers use tractors and heavy work stock, but many use one-horse plows, with which the most efficient work is impossible. The better farmers plow the land in the fall and winter and prepare a good seed bed before planting the crops. Fertilizers in general use are 8-2-2 and 8-3-3 mixtures. When corn follows clover it usually receives a light application of fertilizer, and wheat receives 200 to 300 pounds per acre. Lime is used for clover and alfalfa, at the rate of 500 to 1,000 pounds of burnt lime per acre, with good results.

This type sells for \$50 to \$100 or more an acre, owing to its improved condition and nearness to good transportation.

The Davidson clay loam is probably the strongest soil in the county, and can be built up to and maintained in a high state of productiveness. In Davidson County this soil is held in high esteem for the production of wheat and clover. Near Rock Hill, S. C., alfalfa is grown successfully on this type, and it is probably the best soil in North Carolina for this crop.

## IREDELL LOAM.

The surface soil of the Iredell loam is a dark-gray or dark-brown to nearly black loam, very fine sandy loam, or silt loam, 5 to 10 inches deep. The subsoil is a yellowish-brown, dingy-yellow or greenish-yellow, sticky, waxy, impervious clay, which usually grades at about 15 to 30 inches into greenish-yellow material, the partly decayed diorite rock. Small rounded iron concretions are in abundance, being scattered over the surface and mixed with the soil material. Many diorite boulders are present on the surface, and small, soft, black concretions occur in the subsoil. A few areas of Iredell stony loam and clay loam are included with the type. The subsoil when exposed to the air crumbles in roughly cubical aggregates and assumes a dingy-brown or rusty color. Locally this type is called "bull-tallow land" or "blackjack-oak land."

Along the line of contact between this soil and the Triassic soils, the surface layer is a yellowish-brown fine sandy loam to sandy loam and the subsurface is brownish yellow to a depth of 6 to 9 inches. In places along this line the subsoil is dull reddish, purplish, and bluish in color.

The Iredell loam is found mainly in the central part of the county. The largest areas lie west of Hebron School along the north side of Eno River, between Durham and the Eno River, and 1½ miles north of Gorman. One area is developed to the south of Mineral Springs School, and smaller areas are scattered over the southern part of the county.

The type has a nearly level to gently rolling to rolling topography, becoming hilly and broken as the streams are approached. The smoother areas are about 1 mile northwest of the County Home, south of Chambley School, and 1 mile south of Hebron School. The natural surface drainage is good except in the flats. Owing to the dense and impervious nature of the subsoil, the underdrainage is poor.

The Iredell loam is not considered an important soil. Probably 40 per cent is under cultivation, and the rest is forested with blackjack oak, white, red, and post oaks, hickory, dogwood, and pine, with some cedar and old-field pine.

Cotton, corn, wheat, and oats are the principal crops. Cowpeas, vetch, and Japan clover do well and afford good pasturage. Cotton yields one-fourth to three-fourths bale, corn 15 to 50 bushels, oats 20 to 40 bushels, and wheat 8 to 15 bushels per acre. Fertilizer is used on all these crops. Cotton usually receives from 200 to 400 pounds of 8-2-2 or 8-3-3 fertilizer. Less is used on corn, wheat, and oats. Cotton and corn generally get an application of nitrate of soda in July, which seems to give a considerable increase in yield. Cotton has a tendency to rust and corn to "fire" or "french" on this soil. Liberal applications of kainit seem to prevent this. Lime is used to some extent and in most cases improves the condition of the soil and increases the yields.

Land values range from \$30 to \$100 an acre, depending on state of improvement and nearness to transportation.

More of the Iredell loam could be cleared and put into cultivation. This soil can be built up to and maintained in a high state of productiveness, and the yields of corn, cotton, wheat, and oats could be greatly increased. Grasses and clover do well on this type, and stock raising could well be extended upon it.

## MECKLENBURG LOAM.

The surface soil of the Mecklenburg loam is a dark-brown to reddish-brown loam 6 to 10 inches deep. The subsoil is a yellowish-brown or brownish-yellow to yellowish-red, tough, waxy, tenacious clay, which usually passes into the disintegrated greenish-yellow diorite rock within the 3-foot section. The lower part of the subsoil is more friable owing to the presence of the partly decomposed rock. In places the subsoil is a dingy-red plastic clay. Small rounded iron concretions are present in the soil, and fragments of diorite, ranging in size from small fragments to large bowlders, are scattered over the surface and mixed with the soil material.

The Mecklenburg loam occurs in small areas west of Bragtown around the County Home, and just south and north of the Eno River on the Roxboro road. The largest areas lie  $1\frac{1}{2}$  miles south of the city reservoir and 1 mile north of Whites School.

This type has a gently rolling to strongly rolling surface. The area south of the city reservoir is the least rolling. Surface drainage is good, except in a few flats.

A small part of this type is in cultivation, the rest is forested with white, red, post, and blackjack oaks, some hickory, dogwood, cedar, and some pine.

Corn, cotton, oats, and wheat are the chief crops. Cowpeas, soy beans, clover, and grasses are minor crops. It is well adapted for pasture and is used mostly for this purpose. Corn yields from 15 to 40 bushels, cotton one-fourth to three-fourths bale, oats 20 to 40 bushels, wheat 8 to 15 bushels per acre. Clover and grasses are grown for hay and give fair yields.

Corn usually receives 200 to 300 pounds per acre of an 8-2-2 fertilizer, or, following a crop of legumes, a similar application of acid phosphate. About 400 to 500 pounds of the same complete mixture is used for cotton. All crops except clover, cowpeas, and soy beans are fertilized more or less.

Land values on this type range from \$30 to \$150 an acre, depending on improvements and nearness to towns and transportation.

By proper management the Mecklenburg loam can be made a productive soil. Deeper plowing, better preparation of the seed bed, growing more clover, cowpeas, and soy beans, the rotation of crops, and the use of phosphates and lime will be found beneficial.

## WILKES FINE SANDY LOAM.

The surface soil of the Wilkes fine sandy loam is a light-gray to gray fine sandy loam, passing at about 3 to 6 inches into a yellow fine sandy loam which extends to a depth of 10 to 15 inches. The typical subsoil consists of a brownish-yellow or mottled yellow and gray, tough, plastic sandy clay or yellowish-brown plastic clay. Mottlings of red, gray, and yellow occur locally in the subsoil. In places the disintegrated rock is encountered at depths of 24 to 30 inches. In many places the upper part of the soil section resembles Appling and Durham soils and the lower subsoil is similar to the Iredell subsoil.

In the vicinity of Funston, near the headwaters of Ellerbe Creek, is a small area of sandy loam, which owing to its small extent and the fact that it is not essentially different from the Wilkes fine sandy

loam, except in texture, has been included with the latter. The topography, drainage conditions, and agricultural value compare favorably with the fine sandy loam.

There are also included with this type, mostly in the vicinity of Mangum Store, patches of Durham fine sandy loam and Appling fine sandy loam, and spots of Iredell fine sandy loam, too small to separate on a map of the scale used in the present survey.

The Wilkes fine sandy loam is developed chiefly in the northeastern part of the county. The largest areas lie south of Bahama Farm Life School, and near Mangum Store. A few smaller bodies occur in Mangum Township.

The topography is nearly flat or gently rolling to rolling. Drainage is good, except in the flats and at the heads of small streams.

This type is considered a good soil, but the crop yields are slightly lower than on the Appling or Durham soils. Over half of it is under cultivation. Tobacco, corn, and cotton are the principal crops. Most farmers produce enough corn, hay, and forage for use on the farm. Other crops, such as cowpeas, soy beans, wheat, oats, clover, vegetables, and fruits, are grown in a small way. Owing to the denseness of the subsoil, the crops on the more nearly level areas are damaged slightly by long rainy periods.

The method of handling and the fertilizer practices are essentially the same as on the Appling and Durham fine sandy loams. Land of this type is usually sold with the associated soils.

The Wilkes fine sandy loam is deficient in organic matter. Deeper plowing, turning under green-manure crops, such as cowpeas, soybeans, clovers, vetch, and rye, and adding of lime at the rate of 1,000 to 2,000 pounds per acre would likely increase the yields and improve the soil.

#### CONOWINGO SILT LOAM.

The surface soil of the Conowingo silt loam is a yellowish-gray to light-gray floury silt loam, underlain at 2 to 4 inches by a pale-yellow silt loam which extends to a depth of 6 to 9 inches. The subsoil is a dingy-yellow or brownish-yellow, waxy, sticky, impervious clay, resembling the subsoil of the Iredell soils. The surface soil in many places is almost identical with that of the Alamance silt loam. This soil is developed chiefly in the slate-belt section of the State. The disintegrating bedrock is encountered within the 3-foot section in many places.

This type is represented by a few areas scattered throughout the slate belt. The largest areas lie  $1\frac{1}{2}$  miles southwest of Rougemont, 1 mile south and 2 miles southwest of South Lebanon School, and 1 mile east of Coles Store.

The topography is level to rolling. The drainage on the rolling areas is generally good, while in the flat or level areas it is poorly established and ditching or tiling is necessary.

The Conowingo silt loam is not very important. A small part of it is under cultivation, and the rest supports a forest growth of white, black, red, post, and blackjack oaks, pine, and dogwood, with some cedar and old-field pine. Cotton and corn are the chief crops. Wheat, oats, grasses, clovers, and sorghum do only fairly well.

Deeper plowing, drainage, the incorporation of vegetable matter and lime are among the principal needs of this soil.

## ALTAVISTA FINE SANDY LOAM.

The surface soil of the Altavista fine sandy loam consists of a grayish-yellow fine sandy loam or very fine sandy loam, passing at about 3 to 5 inches into a pale-yellow or mottled gray and yellow compact fine sandy loam, extending to a depth of 7 to 12 inches. The subsoil is a yellow friable fine sandy clay, mottled in most places with gray in the lower part. In some places the mottled subsoil is a rather tough clay below a depth of 30 inches. As mapped the type includes some patches of Altavista sandy loam and silt loam, Wickham fine sandy loam, and Roanoke silt loam.

The largest areas of the Altavista fine sandy loam occur on the south side of the Eno River near its mouth, and on the west side of the Flat River south of the Durham pumping station. Smaller bodies lie along Ellerbe, Newhope, Morgan, Little, and Northeast Creeks, and elsewhere.

The type occupies flat second bottoms or low stream terraces consisting of material which apparently was deposited over former flood plains at a time when the streams flowed at higher levels than at present. It is no longer overflowed except by extremely high floods. The surface and underdrainage are very well established over the greater part of this type and only some of the flatter or depressed areas are poorly drained.

This soil is not very important, on account of its small extent. Most of it is under cultivation, corn and tobacco being the leading crops. Corn yields from 15 to 35 bushels, and tobacco from 500 to 800 pounds per acre. Oats and grasses do well. Cotton, which is only occasionally grown, gives fair yields. The more poorly drained land is usually devoted to pasture, to which it is well suited.

The methods of handling the soil are practically the same as on the adjoining upland. Fertilizer applications are not as heavy as on most upland soils. The 8-2-2 and 8-3-3 mixtures are in general use. With deep plowing and the addition of organic matter, large yields are obtained with a moderate use of fertilizer. By draining the flatter and more poorly drained areas with open ditches or drain tile all this type can be used profitably.

## CONGAREE SILT LOAM.

The surface soil of the Congaree silt loam consists of a brown to slightly reddish brown silt loam ranging from 8 to 18 inches in depth. The subsoil is a light-brown, yellowish-brown, or chocolate-brown compact silty clay loam to silty clay, the heavier texture appearing especially in the lower part of the 3-foot section. In places there is practically no change in color or structure from the surface through the subsoil. In some of the more poorly drained areas along Newhope Creek and other creeks in the county the subsoil is a mottled brown and gray or a bluish silty clay. Most of the material contains small mica flakes. Included in this are small areas of Meadow (Congaree material of variable texture) and of Congaree fine sandy loam and silty clay loam that could not well be shown on a map of the scale used. In a few places bordering soils of the Triassic formation, where erosion has exposed the underlying Indian-red clay, an admixture of this mate-

rial has given small spots of soil of a purplish-red color; these patches would have been mapped as Bermudian silt loam had they been large enough to show on the map.

The Congaree silt loam is developed in continuous strips along all the streams in the southern part of the county and also along some of those in the northern part. Important areas occur along the Neuse River, north of the mouth of Lick Creek, near the mouth of Chunky Pipe Creek, and along Newhope Creek. The largest body in the county lies near the intersection of the Flat and Eno Rivers and south of this point along the Neuse River, where it attains a width of more than a mile.

The type is uniformly flat to undulating and in most places has a gradual slope toward the streams and in the direction of their flow. There are a few depressions or swales. Owing to the prevailing flat surface, the natural surface and underdrainage is poor. In some places open ditches are necessary to provide adequate drainage. This land is subject to overflow, which frequently injures the crops, though seldom causing a complete loss.

This type is in general naturally strong and productive. Those areas occurring along the streams in the Triassic belt are poorly drained. Very little of the type is under cultivation, most of it being in grasses. A little corn is grown along the Flat, Eno, and Neuse Rivers. The crop does well on the better-drained areas. Oats, pumpkins, sorgo, and forage crops are grown to some extent, but the type is used mainly for corn, hay, and pasturage. Considerable areas at one time cleared have been allowed to revert to brush and weeds. Most of this type is forested to water oak, birch, elm, sycamore, gum, and water-loving underbrush.

This type is usually sold with the adjoining uplands; in separate tracts it brings from \$25 to \$100 an acre.

The Congaree silt loam, without fertilization, is considered a good soil for the production of corn. In Rowan, Davidson, and Anson Counties excellent yields of corn are obtained. With drainage, deeper plowing, and better cultivation, corn would doubtless do as well in this county. More of the land could well be cleared, seeded to grass, and used for pastures.

#### SUMMARY.

Durham County, situated in the north-central part of North Carolina, comprises an area of 291 square miles, or 186,240 acres. The topography is prevailingly undulating, gently rolling to rolling, and hilly. Practically all the county is well drained.

The climate is mild and healthful, and the rainfall is abundant and well distributed throughout the year. There is a growing season of about 205 days.

Railroad transportation is excellent. Graded and surfaced roads are being built throughout the county. Durham is the principal town and an important market, particularly for tobacco.

The soils of the county range in texture and structure from light sandy soils to dark-red clay loams. The best soils for the production of oats, wheat, corn, clover, and vetch are the Davidson, Mecklenburg, Iredell, Cecil, and Georgeville types. The light-colored types, with

sandy surface soils, are admirably suited to the growing of bright-leaf tobacco, sweet potatoes, peanuts, and a great variety of garden vegetables. The best tobacco soils, or rather those upon which the bright-leaf tobacco is produced, are the Durham, Granville, and White Store soils. Apples, peaches, grapes, cantaloupes, and watermelons are successfully grown. Corn is grown on practically every soil of the county, but the production of corn, wheat, or oats is not sufficient to supply home consumption; that is, to feed the work stock, hogs, and cattle and furnish bread for home use. While there are hogs and some cattle on practically every farm, many farmers, in addition to buying corn and hay, also buy meat and other necessities which they might well produce.

The bottom-land soils developed along the streams are well suited to the production of corn and hay crops and to grazing. Excellent pastures for cattle can be maintained upon the Congaree silt loam when this soil is drained and properly handled.

Tobacco is the principal cash crop of the county. Cotton is also a cash crop, but the acreage devoted to it is comparatively small. Peanuts could be profitably grown.

Considering the soils, climate, and other natural advantages, the transportation facilities, and the convenient markets, there is every reason to believe that great advancement can be made in the agriculture of Durham County.

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